



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/786,621

02/25/2004

David M. Reed

03008

2048

7590 10/16/2007  
Martha Ann Finnegan, Esq.  
Cabot Corporation  
157 Concord Road  
Billerica, MA 01821-7001

EXAMINER

LIAO, DIANA J

ART UNIT

PAPER NUMBER

4116

MAIL DATE

DELIVERY MODE

10/16/2007

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

## Office Action Summary

Application No.

10/786,621

Applicant(s)

REED ET AL.

Examiner

Diana J. Liao

Art Unit

4116

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set, or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 25 February 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-63 is/are pending in the application.
- 4a) Of the above claim(s) 23-39 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-22 and 40-63 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date 8/20/2004 and 3/24/2005.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_.

Art Unit: 4116

## **DETAILED ACTION**

### ***Election/Restrictions***

1. Claims 23-39 are withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected invention, there being no allowable generic or linking claim. Applicant timely traversed the restriction (election) requirement in the reply filed on 09/04/2007.

2. Applicant's election with traverse of invention I in the reply filed on 9/4/07 is acknowledged. The traversal is on the ground(s) that the inventions are closely related and that there is no burdensome search. The examiner has taken the argument into consideration. In the case of inventions I and III, the product and the capacitor or anode comprising the product, the examiner agrees and has withdrawn the restriction. In the case of inventions I and II, the product and process inventions, the argument is not found persuasive because they require different fields of search. An oxide can be made a number of different ways, as stated in the original restriction requirement. The steps required in the process in the instant application are not integral to the product made, and thus there is a burden on the examiner to search all of the claims.

The restriction between inventions I and III has been withdrawn and thus invention III (claims 55-58) are to be examined with invention I (claims 1-22, 40-63). The requirement separating invention II is still deemed proper and is therefore made FINAL.

Art Unit: 4116

***Status of the Application***

Claims 1-22 and 40-63 are pending. Claims 23-39, drawn to the non-elected invention, have been withdrawn.

***Priority***

3. Acknowledgment is made of applicant's claim for domestic priority under 35 U.S.C. 119(e). The certified copy has been filed in provisional Application No. 60/450536, filed on 02/26/2003.

***Information Disclosure Statement***

4. The information disclosure statements (IDS) were submitted on 08/20/2004 and 03/24/2005. The submission is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner.

***Claim Rejections - 35 USC § 102***

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 40, 44-52, 57, 58, 62 and 63 are rejected under 35 U.S.C. 102(b) as being anticipated by Fife (WO 2000/15556).

Art Unit: 4116

Claim 40 is drawn to a valve metal oxide having an atomic ratio of valve metal to oxygen that is 1:(less than 2.5) comprising of granules having a size from 5-1000 microns. Claims 46-48 state specific ratios of 1:1.1, 1:0.7, and 1:0.5. Claims 44 and 45 state the valve metal to be niobium, and the ratio to be 1:(less than 1.5). Claims 50 and 51 state the specific niobium oxides of, NbO, NbO<sub>0.7</sub> and NbO<sub>1.1</sub>. Claim 49 states a specific surface area from 0.5-10.0 m<sup>2</sup>/g. Claim 52 states that the valve metal oxide comprises of nitrogen.

Fife discloses reduced valve metal oxides with metal to oxygen ratios including 1:(less than 2.5), 1:1.1, 1:0.7, and 1:0.5. (page 9, lines 3-4 and 8) The ratios for niobium oxides specifically include 1:1.1, 1:1 and 1:0.7, which are in the range of 1:(less than 1.5). The powder form of this oxide is also stated to be separated from larger particles using a 40 mesh screen (page 15, line 2), which corresponds to a size of 420 microns, which anticipates the range of 10-5000. Fife also teaches the preferred surface area of these metal oxides to be about 0.5 to 10.0m<sup>2</sup>/g. (page 9, lines 17-18) It also teaches that the metal oxides may contain levels of nitrogen. (page 8, lines 18-19).

Therefore claims 40 and 44-52 are anticipated by prior art.

Claims 57 and 58 claim a capacitor and capacitor anode comprising the valve metal suboxide of claim 40.

Fife discloses a capacitor and capacitor anode comprising the valve metal suboxide. (page 1, lines 19-24)

Therefore, claims 57 and 58 are anticipated by prior art.

Claims 62 and 63 state the valve metal oxide of claim 40 wherein it comprises a valve metal phase or a secondary suboxide phase.

Fife discloses a table which characterized several reduced valve metal oxide products by their main components. Sample 18 contains a metal phase, and all samples contain at least two suboxide phases. (page 18)

Therefore, claims 62 and 63 are anticipated by prior art.

Claims 40, 44-52, 57, 58, 62, and 63 have been anticipated by the cited reference and they are therefore unpatentable.

### ***Claim Rejections - 35 USC § 103***

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Art Unit: 4116

9. Claims 1-22, 54-56, and 59-61 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fife.

Regarding claims 1-12 and 14 and 54-56, Fife shows that the main components of its oxides are suboxides, as denoted by the components listed in the XRD Major phases. In addition, sample 18 has a metal phase, and a major and minor phase of different suboxides. Sample 13, for example, has three suboxide components. (page 18) It also teaches a preferred surface area of 0.5-10.0 m<sup>2</sup>/g. (page 9, lines 16-18) Fife et al, also teaches a slug of NbO suboxide, and makes no mention of any other components, implying that the primary phase is NbO. (page 16, line 3) Fife also teaches a capacitor and capacitor anode comprising the valve metal suboxide. (page 1, lines 19-24)

However, Fife does not teach the purities stated by claims 1-10 which is at least 75% or higher, ranging to 99.95%, by weight.

However, it would be obvious to one of ordinary skill in the art to be able to create suboxides of the purities denoted in the instant claims. Fife teaches that if the starting materials are of high purity, the reaction can reach 100% yield. (page 5, lines 5-6) One of ordinary skill in the art would know that the products of a reaction are dependent on the purities of the starting materials, evenness of mixing and the time taken to produce the suboxide, different levels of purity can be achieved. The table of oxide products already suggests that a suboxide is the main component.

Art Unit: 4116

One would be motivated to achieve different high purities in order to create a homogenous powder with accordingly homogenous characteristics. Other considerations would include the time it may take to achieve the purity and if it is cost effective. Since no reasons or specific utility are given for the stated purities in the instant claims, the varying purities are found to be obvious variants of each other, and there is no reason to believe that the products in Fife could not have been fashioned to achieve the purity of the instant claims.

Therefore, claims 1-12 and 14 and 54-56 are not found patentable over prior art.

Regarding claims 13 and 15-18, Fife teaches that most of the niobium used to prepare a sample was converted to suboxide and that some pure niobium remains, but does not teach a valve metal phase of the percentage purity by weight percent as stated in the instant claims, which is below about 25%.

However, it would be obvious to one of ordinary skill in the art to obtain weight percentages of the instant claims. Similar to the reasoning above pertaining to the primary suboxide purity, although the valve metal phase purity percentage is not disclosed in the reference, it is also not found to be patentably distinct from the composition in Fife. Various purity percentages can be made by changing factors that are well known in the art. Since no reasoning is given for these specific percentages, claims 13 and 15-18 are not found patentable over prior art.



Art Unit: 4116

Regarding claims 19-21, Fife et al. teaches a product with a secondary suboxide phase as mentioned above, but does not provide weight percentages of this phase.

However, it would be obvious to one of ordinary skill in the art to obtain weight percentages of the instant claims. Similar to the reasoning above pertaining to the primary suboxide purity, the product in Fife contains a "minor" secondary suboxide component, and this could very easily fall into the ranges that are specified by the instant claims, 0.01 to 5%, to 0.01 to 25%. Since no reasons are given for these secondary phase purities, claims 19-21 are not found patentable over prior art.

Regarding claim 22, Fife does not teach that the metal phase and the secondary suboxide phase are together less than 25% by weight.

However, it would be obvious to one of ordinary skill in the art to obtain this weight percentage. Reasoning for the varying percentages of the metal phase and the secondary phase are discussed above, and thus the combination of them being 0.1-25% by weight is an obvious variant and also found unpatentable.

Regarding claims 59-61, Fife teaches a valve metal oxide of granules of at most 420 microns with primary suboxide phases, as discussed earlier in a prior rejection of independent claim 40. However, it does not teach specific purities by weight percent.

However, it would still be obvious to one of ordinary skill in the art to be able to obtain these purities using the same reasoning applied to claims 1-10 above. The different purities of the major suboxide phases are considered obvious variants of each

Art Unit: 4116

other. Since no reasons are given for these specific weight purities, claims 59-61 are not found patentable over prior art.

Claims 1-21, 54-56 and 59-61 are found to be obvious given the cited references and found unpatentable over prior art.

10. Claims 13 and 15-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fife as applied to claims 1-14 above, and further in view of Shimamune, et al. (US 5,441,670).

Fife does not teach a valve metal phase of the percentage purity by weight percent as stated in the instant claims, which is below about 25%.

However, it would still be obvious to one of ordinary skill in the art to have a low percentage of valve metal in view of Shimamune, et al. Shimamune, et al teaches a conductive mixed oxide that can be used as electrodes. The composition of this mixed oxide comprises 1-10% of at least one of titanium or titanium hydride, in addition to stoichiometrically oxygen deficient compounds of tantalum and niobium. (see abstract)

11. Claims 41-43 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fife as applied to claims 40, 44-52, 57, 58, 62 and 63 above, and further in view of Fife (US 6,051,044, referred to as US '044 hereafter).

Fife teaches an oxide with a granule size of no larger than 420 microns as evidenced by the 40 mesh screen used to filter through the product. (page 15, line 2)

Art Unit: 4116

However, it does not teach a size of 30-300 microns, or anything about the flow of the product being between 100-1000 mg/s or 300-700 mg/s.

However, it would be obvious to one of ordinary skill in the art to create a product of this size and flow in view of US '044. US '044 teaches a niobium powder composition for use in electrolytic capacitors. These powders can be flaked, and agglomerated before use. The flow is preferably greater than 80 mg/s. (col 5, lines 3-4) This agglomerated powder is also to be a maximum size of 300 microns. (mentioned in the examples, e.g. col 9, line 40)

It would be obvious to combine these references because they are both drawn to making a capacitor component. In addition to the intended use, the powder properties are very similar in terms of surface area, size, and composition, and thus one can reasonably expect that the flow of the product in Fife is both similar to the ones in US '044 and also a desirable property.

Therefore, claims 41-43 are not found patentable over prior art.

12. Claim 53 is rejected under 35 U.S.C. 102(b) as anticipated or, in the alternative, under 35 U.S.C. 103(a) as obvious over Fife.

Claim 53 is drawn to a valve metal suboxide which has a shape that is nodular, flaked, angular or a combination thereof.

Fife teaches a starting material of metal oxide that is flaked, angular, nodular, and mixtures thereof. (page 3, lines 19-20) Since there is no significant physical deformation of the starting material before it becomes a suboxide, it is reasonable to

Art Unit: 4116

assume that the suboxide also has a shape that is flaked, angular, or nodular.

Therefore, claim 53 is found inherent in the cited reference.

### ***Conclusion***

Claims 1-22 and 40-63 have been rejected. No claims have been allowed.

Claims 23-39 were not examined, being drawn to the non-elected invention.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Diana J. Liao whose telephone number is 571-270-3592. The examiner can normally be reached on Monday - Friday 7:30am to 5:00pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vickie Kim can be reached on 571-272-0579. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 4116

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

DJL

  
VICKIE Y. KIM  
SUPERVISORY PATENT EXAMINER